

REMARKS/ARGUMENTS

As a result of this Amendment, claims 1-21 are under active consideration in the subject patent application.

The present Continuing Examination Application has been filed in response to the Final Official Action mailed on July 30, 2003. In the Final Action, the Examiner had:

- (1) entered Applicants' amendment of May 16, 2003, into the case;
- (2) rejected claims 1, 6-7, 11, 13, and 17 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,917,707, issued to Khandros et al. (the "Khandros reference");
- (3) rejected claims 2-3, 5 and 12 under 35 U.S.C. 103(a) in view of Khandros;
- (4) rejected claim 4 under 35 U.S.C. 103(a) in view of a proposed combination of the Khandros reference with U.S. Patent No. 5,665,473, issued to Okoshi et al. (the "Okoshi reference");
- (5) rejected claims 8-10, 14-16, and 18-20 under 35 U.S.C. 103(a) in view of a proposed combination of the Khandros and Okoshi references;
- (6) rejected claim 21 under 35 U.S.C. 103 in view of a proposed combination of Khandros with Mowatt et al. ("the Mowatt reference"); and
- (7) stated that the arguments with respect to claims 1-21 have been considered but are moot in view of the new grounds of rejection.

With regard to Items 1 and 2, Applicants traverse the Examiner's rejection of claims 1, 6-7, 11, 13, and 17 under 35 U.S.C. 102(b) as being anticipated by

the Khandros reference. Independent claims 1, 11, and 17 have been amended so as to further distinguish them from the prior art relied upon by the Examiner. Dependent claims 2, 7-8, and 13-14 have also been amended so as to conform to the changes made to their base claims. Those changes to the claims are fully supported by the specification, drawings, and claims as originally filed.

Applicants have claimed a heat spreading interposer suitable for use with electronic components including those using land grid arrays and pin grid arrays. The claimed heat spreading interposer includes an array of contacts supported in a laminated housing so as to protrude from the top and bottom surfaces. In this way, the interposer may be placed between an active component, e.g., an integrated circuit chip, and a printed wiring board. Applicants' interposer provides electrical connection between correspondingly positioned contact pads by use of flexible, compressible conductive buttons that are appropriately located in holes in an insulating housing. The housing comprises a lamination having at least one layer of thermally conductive material supported by at least one coextensive layer of a dielectric material so that a portion of the at least one flexible electrical contact is (i) engaged, and (ii) in thermal communication with the at least one layer of thermally conductive material. This structure is simply absent from all of the prior art relied upon by the Examiner.

More particularly, Khandros discloses an assembly including an electronic component having a surface and a conductive contact carried by the electronic component and accessible at the surface. The conductive contact has a laminated structure that includes an internal flexible elongate member having first

Appln. No.: 10/055,771
Preliminary Amendment
Docket No.: H2022-00002

and second ends, with an electrically conductive shell that is formed of at least one layer of a conductive material enveloping the internal flexible elongate member. In other words, Khandros discloses a laminated electrical contact having a flexible core with an outer conductive coating that is suitable to be positioned in a non-laminated housing. This is not the structure claimed by Applicants.

As the Examiner is well aware, anticipation under 35 U.S.C. §102 requires that each and every element of the invention defined in the claim be met in a single prior art reference. Those elements must either be inherent or disclosed expressly, and must be arranged as described in the claim. See, Diversitech Corporation v. Century Steps, Inc., 850 F.2d 675, 7 U.S.P.Q.2d 1315 (Fed. Circuit 1988), Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 U.S.P.Q.2d 1057 (Fed. Circuit 1988), and Richardson v. Suzuki Motor Company, 868 F.2d 1226, 9 U.S.P.Q.2d 913 (Fed. Circuit 1989). Nowhere within the four corners of Khandros, is there disclosure or even a vague suggestion of an heat spreading interposer having at least one flexible electrical contact supported by a laminated housing comprising at least one layer of thermally conductive material supported by at least one coextensive layer of a dielectric material. This structural arrangement is simply absent from the Khandros reference.

Moreover, the Examiner's characterization of the structures taught by Khandros is demonstrably incorrect. The Examiner has taken the position that Khandros shows:

"... a housing comprising a laminated structure having a plurality of thermally conductive layers 103, 204, 159 and a dielectric layer 102, 202, 156, supported between a plurality of substrates (printed circuit boards) wherein the contacts 192, 207, 187 are flexible (compressible) and have one end protruding from one side of the housing and another end protruding from another side of the housing. The housing has a plurality of through holes with liners in thermal communication with the thermally conductive layers. . . "

For one thing, the structures identified by reference numerals 103, 204, 159 in Khandros are discrete solder pads or solder rings (see generally, col. 3, col. 8, and col. 10). The structures identified by reference numerals 102, 202, 156 in Khandros are electronic components and a printed circuit board (see generally, col. 4, col. 10, and col. 8). Applicants respectfully submit that solder pads 103, 204, or solder ring 159, positioned upon electronic components 102, 202, or printed circuit board 156 in no way teaches or suggests a laminated housing comprising at least one layer of thermally conductive material supported by at least one coextensive layer of a dielectric material. Solder pads 103, 204, and solder ring 159 cannot be said to be a portion of a housing. One skilled in the art would understand them to be more associated with the circuitry supported by a housing or PCB. For another thing, not one of Khandros' figures depict a laminated housing structure, i.e., interleaved, coextensive layers of thermally conductive and dielectric materials. Instead, each and everyone of Khandros' figures illustrate a housing cross-hatched for one or more metals, without exhibiting any evidence of coextensive lamina comprising thermally conductive and dielectric layers.

These features of the present invention are neither inherent to the structure taught by Khandros et al., nor are they disclosed expressly in that reference. Applicants' invention as defined by independent claims 1, 11, and 17 is not anticipated by the disclosure of Khandros et al. Accordingly, amended independent claims 1, 11 and 17, are not anticipated by Khandros et al. Claims 1, 11 and 17 are allowable. Likewise, dependent claims 2-10, 12 – 16 and 21 are all allowable at least through dependency from the foregoing amended independent claims.

With regard to Item 3, the Examiner admitted that Khandros failed to disclose a plurality of dielectric layers, the material of the dielectric layer, and the thickness of the conductive layer. The Examiner then asserts, without any documented support, that the use of thermally conductive insulating material is well-known in the art of electrical connectors. Applicants respectfully submit that neither Khandros nor any reference identified and asserted by the Examiner, teaches or suggests a heat spreading interposer including a laminated housing comprising at least one layer of semiconductor material supported by at least one coextensive layer of a dielectric material. The Examiner has provided no documentary support for the assertion relied upon in rejecting claims 2, 3, 5, and 12, as is required by the rules. In any event, claims 2, 3, 5, and 12 are allowable, at least through dependency from amended claims 1 and 11, respectively.

With regard to Item 4, the Examiner has proposed a combination of the Khandros and Okoshi references in support of his rejection of claim 4. In order for a prima facie case of obviousness to be established, there must be some

suggestion or motivation, either in the reference itself, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference must teach or suggest all of the claim limitations (MPEP §2142). Nowhere within the four corners of either the Khandros or Okoshi references is there any teaching or suggestion, whatsoever, of a heat spreading interposer including a laminated housing comprising at least one layer of semiconductor material supported by at least one coextensive layer of a dielectric material. Thus, the thickness limitations presented in claim 4 when combined with the subject matter defined by independent claim 1, presents a patentable range of thicknesses for the dielectric layer in Applicants' laminated housing which is not found within the prior art.

Dependent claim 4 is allowable.

With regard to Item 5, the Examiner admits that Khandros does not show wings projecting outwardly from their housing and bonded to a conductive layer. This is not surprising since Khandros makes no suggestion of a laminated housing at all. The Examiner has once again attempted to argue that Okoshi shows thermally conductive layers with wings 24 and 32. Applicants respectfully submit that no such wings exist within the Okoshi reference, instead, the structure identified by reference numerals 24 and 32 are solder leads which, at col. 7, lines 51 – 55, provide for ". . . connection between the outer lead 32 of the member 28 and the lead 26 of the signal layer 16 can be performed by a suitable means, such as electric spot welding, laser welding, ultrasonic bonding, thermocompression, pressure welding, brazing, soldering, or bonding with a

conductive adhesive. . ." Thus, Okoshi's solder leads 24,32 are structures meant to be electrically and mechanically bonded to other structures so as to pass current. This function would generate heat, not dissipate heat as suggested by the Examiner. Nothing in Okoshi, or for that matter Khandros, suggests that any disclosed structure, let alone Okoshi's solder leads 24,32, would help to spread heat. Moreover, neither Khandros nor Okoshi alone or, in the proposed combination, disclose a layer of thermally conductive material that is sized larger than a laminated housing so as to form at least one wing projecting outwardly from at least one edge of the laminated housing so as to dissipate heat into the ambient environment. Dependent claims 8-10, 14-16, and 18-20 are allowable.

With regard to Item 6, the Examiner admits that Khandros does not provide a land grid array and pin grid array device. The Examiner relies upon the Mowatt reference to simply disclose a land grid array mounted electronic device and a pin grid array mounted electronic device, but fails to identify any teachings within either Khandros or Mowatt that would suggest such a combination or motivate one of ordinary skill in the art to look to those two references as postulated by the Examiner, absent impermissible hindsight. Moreover, Mowatt does not provide a heat spreading device that includes a laminated housing comprising at least one layer of thermally conductive material supported by at least one coextensive layer of a dielectric material. Claim 21 is allowable.

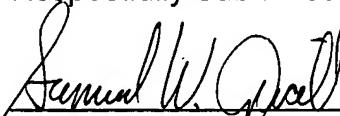
Accordingly, Applicants submit that claims 1-21 present allowable subject matter, and respectfully request that a timely Notice of Allowance be issued in this case.

Appln. No.: 10/055,771
Preliminary Amendment
Docket No.: H2022-00002

If a telephone conference would be of assistance in advancing prosecution of the above-identified application, Applicants' undersigned Attorney invites the Examiner to telephone him at 717-237-5516.

Respectfully Submitted,

Date: 10/28/03


Samuel W. Apicelli
Registration No. 36,427
Customer No. 08933
DUANE MORRIS LLP
305 North Front Street
P.O. Box 1003
Harrisburg, PA 17108-1003
(717) 237-5516

HBG\119881.1